

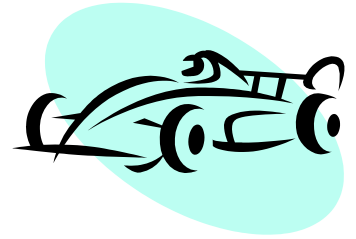
TAG: Learning Set 1
1.2 Design a Test Procedure for
Measuring Vehicle Performance

Name _____

Hour _____ Date _____

Read p. 19.

What is the difference between qualitative and quantitative data?



List the three things that you will be doing during this unit.

1.

2.

3



Reflect

Answer the following questions with your group:

1. How did you know that one car went farther than another?
Describe what you observed to make this comparison.

2. How did you know that one car went straighter than another?
Describe what you observed to make this comparison.

3. How can you compare the performance of the cars quantitatively?
What factors can you measure to make fair comparisons?

Relative Motion

Read the box on p. 21 and the top of p. 22.

Stop and Think

1. Describe the movement of the coaster cars you observed using the terms: *motion*, *position*, *reference point*, and *frame of reference*. Use these terms to describe how you knew one car went straighter or farther than another.
2. Using what you just read about motion, describe the observations you use to compare the motion of the different coaster cars.
3. How do you think you can measure the distance that a coaster car travels? How can you measure the direction in which it travels? Use the terms: *motion*, *position*, and *reference point* to describe how you would measure distance and direction.
4. What reference points would work well when measuring the distance and direction of your coaster car?

Design a Procedure for Measuring Coaster Car Performance

Read p. 23 and the top of p. 24.

As you write your procedure below, remember to include the bullet points listed in the textbook as part of your detailed procedure.

Step	
1	
2	
3	
4	
5	
6	
7	

Communicate

Plan Briefing

Read p. 24 and 25 with your group.

Next, create a poster with your group that includes:

- What are you measuring
- The materials and tools needed for your performance test
- The setup, including all reference points
- The performance-test procedure
- Why you think your performance-test procedure can be used for a fair test

Finally, be prepared to answer the following questions about your performance-test procedure:

- Why do you think your procedure is repeatable?
- How does your procedure keep all test factors the same?
- How can you be sure you will get reliable measurements during testing?
- What factors are the most difficult to keep the same each time you conduct the procedure?
- How can the procedure help you evaluate a coaster's car's performance?
- How can the results of using your procedure be used to improve a coaster car's performance?



STOP! And listen for your Teacher's directions of how to complete the Plan Briefing.

Measuring Direction and Distance

Read p. 26.

What are the two factors that you want to measure and how will you do this? Write your answers in the table below:

Factor	How will you do this?	Unit of measurement you will use



Reflect

The class needs to develop ONE procedure that everyone in class will use to measure. With your group, answer the following questions to help participate in the developing of the class procedure.

1. What do you think you did well in your procedure?
2. What differences did you see in other procedures that you can use to make improvements to your procedure?
3. What will be important to include in the procedure the class develops?

Revise Procedure for Measuring Coaster-Car Performance

Read the bottom of p. 27 with the entire class. Record the procedure along with your class.

Step	
1	
2	
3	
4	
5	
6	
7	

Conduct Your Procedure

Read the top of p. 28 and the *Be a Scientist: Keeping Good Records* on the bottom of p. 28.

Follow the procedure you wrote with your class and record 4 trials of your coaster car on the *Testing My Design* page.



Communicate: Solution Briefing

Read p. 29.

Listen to your teacher's directions for the Solution Briefing.

Keep track of your ideas that you get from other groups as you listen on the *Solution-Briefing Notes* page.



Reflect

Answer the following questions with your group.

1. Compared to the other coaster cars, how well did your coaster car perform? How straight did it go compared to the car that traveled the straightest? How far did it go compared to the car that traveled the farthest? What needs to be improved?
2. Describe how you would like your car to perform?
3. How well do you think you could predict the motion of your car in another trial? Look at the diagram on page 30 in your textbook. Suppose you had to predict where your car would cross one of the finish lines? How would you do that?



What's the point?

Read the bottom of p. 30.

Your challenge for this learning set is to: **Design and Build a Coaster Car that travels straight and Far**. Now that you have measured the performance of your coaster car, how does that help to complete your challenge?